INSTALLATION RESTORATION PROGRAM

PRELIMINARY ASSESSMENT SCORING INFORMATION PACKAGE FORMER BASE LANDFILL

STEWART AIR NATIONAL GUARD INSTALLATION
STEWART INTERNATIONAL AIRPORT
NEWBURGH, NEW YORK

FINAL
NOVEMBER 8, 1991

HAZWRAP SUPPORT CONTRACTOR OFFICE
Oak Ridge, Tennessee 37831
Managed by MARTIN MARIETTA ENERGY SYSTEMS, INC.
For the U.S. DEPARTMENT OF ENERGY under contract DE-AC05-840R21400

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FORMER BASE LANDFILL

STEWART AIR NATIONAL GUARD BASE
NEWBURGH, NEW YORK

Prepared for:
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Prepared by:

ABB ENVIRONMENTAL SERVICES, INC.
PORTLAND, MAINE

Job No. 6975-66

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1.0 INTRODUCTION

The Air National Guard (ANG) initiated an Installation Restoration Program (IRP) at the Stewart Air National Guard Base (Steward ANGB) to evaluate suspected problems associated with past hazardous waste disposal and spill sites. As part of the IRP, the ANG entered into an interagency agreement (IAG) with the Department of Energy (DOE) under which DOE provides technical assistance for the implementation of the IRP. Martin Marietta Energy Systems, Inc. (Energy Systems) Hazardous Waste Remedial Action Program (HAZWRAP) has been assigned responsibility for managing this effort under the IAG.

As a subcontractor for Energy Systems, ABB Environmental Services, Inc. (ABB-ES) (formerly E.C. Jordan Co.) was assigned the task of acquiring site-specific data for the confirmation of contamination at the Former Base Landfill at Stewart ANGB. ABB-ES completed a Site Investigation of the Former Base Landfill (Jordan, 1989), and has recommended that the landfill be closed in accordance with applicable New York State Solid Waste Management regulations.

The U.S. Environmental Protection Agency (USEPA) has indicated that the Former Base Landfill site at Stewart ANGB is a candidate for technical screening to determine if the landfill qualifies for inclusion on the National Priorities List (NPL) under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). To determine if the Former Base Landfill site qualifies for the NPL, the USEPA must score the site using the Preliminary Assessment (PA) Scoring Method. If the site scores above 28.5 using the PA Scoring Method, then the site will be considered for further scoring using the Hazard Ranking System (HRS) and development of an NPL package. USEPA requested that the National Guard Bureau provide EPA with sufficient information on the Stewart ANGB site and surrounding area so that they may score the site using the PA method. ABB-ES was assigned the task of compiling this information package.

The PA Scoring Method employed by EPA involves a set of scoring sheets. For Stewart ANGB, the USEPA submitted scoring sheets to the Guard that were marked-up to indicate site-specific data needs. This information package compiled by ABB-ES provides the specific data required to complete these scoring sheets. The package is structured to coincide with the format of the scoring sheets in the following manner:

Site Identification
Waste Characteristics
Groundwater Pathway
Surface Water Pathway
Soil Pathway
Air Pathway

The final section of this report contains a bibliography of source materials referenced herein.

2.0 SITE IDENTIFICATION

The following is a brief description of location, history, and physiography of the Stewart ANGB site. A more detailed description can be found in the Site Investigation Report (SI) prepared by ABB-ES (Jordan, 1989).

Stewart ANGB is situated 2.5 miles west of the city of Newburgh, in the town of Newburgh, New York. The complex straddles the common border between the towns of Newburgh and New Windsor (see Figures 1-1 to 1-3 from Jordan, 1989). The three municipalities are in Orange County, which is located on the western side of the Hudson River, in the southeastern part of the state, approximately 35 miles northwest of New York City. The ANGB is part of the larger Stewart Airport complex.

The Former Base Landfill is located on the southeastern portion of the base complex. The landfill was operated by the U.S. Air Force (USAF) from sometime after 1963 to 1970. It was reportedly used to dispose of domestic refuse from base housing and waste from on-base food dispensing facilities and aircraft maintenance operations. From 1970 to 1982, the landfill was operated by the New York Metropolitan Transit Authority and a contingent from the U.S. Military Academy (USMA). Disposal operations were discontinued in 1982. The land is now leased to the New York ANG by the New York State Department of Transportation (DOT).

The landfill is approximately 550,000 ft^2 (14 acres) in size. The topography of the site is consistent with the gently rolling topography of the surrounding area. Hills and drainages in the area are aligned in a north-south direction. The eastern slope of the landfill is elevated above the surrounding terrain as a result of disposal activities. Household debris and demolition material are visible at the base of the eastern slope. The surface of the landfill is covered by thick brush and occasional scrubby trees.

An abandoned pesticide disposal site is located approximately 100 feet west of the landfill. Material from the pit was excavated between April 27 and July 1, 1988.

An inactive disposal area, formerly known as the New Windsor Landfill, is located approximately 500 to 1,000 feet southeast of the Former Base Landfill. Based on field observations, a portion of this landfill appears to have encroached onto the Stewart ANGB property (Jordan, 1989). The actual extent of encroachment has not been determined. The landfill was closed in 1986 by the Town Board of New Windsor and the New York State Department of Environmental Conservation (NYSDEC).

3.0 WASTE CHARACTERISTICS

The following is a brief synopsis of the results of investigative activities at the Stewart ANGB site. More detailed descriptions of the contamination present at these sites can be found in the following documents:

> Site Investigation Report, Stewart Air National Guard Base, Newburgh, New York. prepared by E.C. Jordan Co, 1989. (Jordan, 1989)
>
> Evaluation of Analytical Data From City of Newburgh Water Supply, Newburgh, New York, Stewart Annex, USMA Newburgh Landfill, Newburgh, New York, and New Windsor Landfill, New Windsor, New York. prepared by NUS Corporation, October 15, 1984. (NUS, 1984)

3.1 Soil/Sediment

- Metals were detected in surface and subsurface soils from the Former Base Landfill within natural background levels (Jordan, 1989).

- No volatile organic compounds (VOCs) were detected in soils from the Former Base Landfill above the detection limit (Jordan, 1989).

- Polynuclear aromatic hydrocarbons (PAHs) were detected in one surface soil/sediment sample from the toe of the Former Base Landfill at concentrations less than one mg/kg (Jordan, 1989).

- Aroclor 1254 was detected at low concentrations (0.21 mg/kg) in two subsurface soil samples (depths of 12 and 31 feet) from a boring located west and topographically upgradient of the Former Base Landfill (Jordan, 1989). These samples were intended to serve as site-specific background.

- DDT, DDD, and DDE were detected in four replicate samples from one sediment location in a man-made pond on the east side of the Former Base Landfill. This pond is located along the surface drainage pathway downslope of the pesticide burial pit. DDT was found in the highest concentrations, between 2.3 and 3.1 mg/kg (Jordan, 1989).

- DDT, DDD, DDE and other organochlorine pesticides were detected at concentrations less than 1 mg/kg in five surface soil/sediment samples from

Murphy's Gulch and six samples from the drainage pathway along the Patrol Road that leads to the intermittent man-made pond (NUS, 1984 and Jordan, 1989).

3.2 Groundwater

- Mercury was detected in one of four replicate samples, at 7.5 μg/liter, from one well downgradient of the Former Base Landfill. Its absence in the other three replicates and other downgradient wells suggests that the mercury in this one replicate may not be attributable to the landfill (Jordan, 1989).

- DDT, DDD, DDE and 2,4-D were detected in groundwater in wells installed by Dames & Moore upgradient of the Former Base Landfill and downgradient of the pesticide burial pit (Jordan, 1989); the highest concentrations were detected in 1989, with DDT at 760 μg/L.

- A low concentration 1,1,1-trichloroethane (less than 10 μg/liter) and trace levels (less than the detection limit) of several other VOCs (vinyl chloride, trans-1,2-dichloroethene, 1,1-dichloroethane, chloroethane, chloromethane, bromomethane, and chloroform) were detected in a shallow overburden groundwater monitoring well downgradient of the landfill (Jordan, 1989).

- No semi-volatile organic compounds (SVOCs) were detected in groundwater downgradient of the Former Base Landfill (Jordan, 1989).

- No contamination was detected in four private water supply wells downgradient of the Former Base Landfill (NUS, 1984).

3.3 Surface Water

- DDT was detected in one surface water sample from the man-made pond east of the Former Base Landfill (Jordan, 1989).

- Low concentrations (less than 0.2 mg/liter) of chloroethane, toluene, 2-butanone, and xylenes were detected in one surface water sample from Murphy's Gulch near the New Windsor landfill (NUS, 1984).

- No contamination was detected in stream samples further downgradient of the landfills, or in samples from Lake Washington (NUS, 1984).

4.0 GROUNDWATER PATHWAY

The following discussion provides a brief summary of information gathered and observations made with regard to the potential for human exposure to contaminated groundwater at the Stewart ANGB site. These data were obtained from the following sources:

Site Investigation Report, Stewart Air National Guard Base, Newburgh, New York. prepared by E.C. Jordan Co, 1989. (Jordan, 1989)

Evaluation of Analytical Data From City of Newburgh Water Supply Newburgh, New York, Stewart Annex, USMA Newburgh Landfill, Newburgh, New York, and New Windsor Landfill, New Windsor, New York. prepared by NUS Corporation, October 15, 1984. (NUS, 1984)

U.S. Geological Survey, Computer Database Search of Wells Within Newburgh and Cornwall Quadrangles. (USGS, 1991).

Bragdon, F. Site Inspection Lead, E.C. Jordan Co. personal communication with Orange County Health Department and the Water Departments of the Town of New Windsor, the City of Newburgh, and the Town of Newburgh, 1988. (Bragdon, 1988)

Smith, J.S. ABB Environmental Services. personal communication with Steven DiDio, New Windsor Water Superintendent. August 21, 1991. (Smith, 1991a)

Climates of the States. Volume 2, Third Edition, National Oceanic and Atmospheric Administration, Gale Research Company, Detroit Michigan, 1985. (NOAA, 1985)

- The Former Base Landfill is located in a recharge area above a shallow aquifer in glacial till. Groundwater in the till discharges under confined conditions into Murphy's Gulch. The shallow portion of the bedrock aquifer is confined by glacial till. The glacial till has a low to moderate permeability with an average hydraulic conductivity calculated to be 4.19×10^{-5} cm/sec. The hydraulic gradient is about 0.07 ft/ft with an assumed effective porosity of 0.2. The estimated groundwater velocity is 15 ft/yr. Vertical gradients between bedrock and till are downward in most locations, ranging from 0.005 to 0.239. Groundwater flow in the till and bedrock is toward the east and southeast.

- The average annual rainfall in this area of New York (recorded at Poughkeepsie, NY, 1951-1980) is 40.16 inches; average annual snow fall is 42.6 inches (NOAA, 1985).

- The nearest water supply well to the Former Base Landfill serves a private residence located on Liner Road, east of the New Windsor landfill and the New York State Thruway, approximately 0.25 mile southeast of the Former Base Landfill (NUS, 1984).

- There are approximately four water supply wells within one mile of the Stewart ANGB; an additional 14 wells between one and two miles, 31 between two and three miles and 33 between three and four miles (USGS, 1991). These wells were located based on latitude and longitude coordinates provided in the USGS well database. The comprehensiveness of this database is not known. For instance, the four wells sampled by NUS in 1984 could not be positively identified using the information provided in this database.

- The attached Figure 1 indicates the approximate location of these water supply wells in relation to the Stewart ANGB. As indicated, the majority of the wells are east and south of the base.

- The majority of residents in the vicinity of Stewart ANGB are served by the municipal water supply systems of New Windsor, and the City and Town of Newburgh. The source of the New Windsor water supply is the Catskill Aqueduct (i.e., the New York City water supply). Lake Washington, with backup from Brown Pond, is the water supply source for the City of Newburgh. The Town of Newburgh water supply is Chadwick Lake, located 3 miles north Stewart ANGB.

- Those residential areas near Stewart ANGB that are not served by municipal systems include the following:

  Route 17K, west of the thruway to east Coldenham
  Orr Avenue, west of Union Avenue and east of the thruway
  Liner Road, west of Union Avenue and east of the thruway
  Silver Stream and Liner Roads, from Route 207 to the thruway

- Of the wells listed on the USGS database within four miles of Stewart ANGB, 34 are designated as domestic wells, 11 as public supply wells (6 for New Windsor water supply), 17 were undesignated (10 New Windsor water supply), 5 as unused (all from Cornwall water supply), 2 as commercial, and 1 as institutional (USMA at West Point) (USGS, 1991).

- Wells owned by the Town of New Windsor are used as a secondary water supply when the Catskill Aqueduct is shut down. Only one such well is currently operational (Smith, 1991a).

- The well with the maximum yield (1,500 gpm) within four miles of Stewart ANGB listed in the USGS database is owned by the New Windsor water district.

- Low concentrations of VOCs (less than 10 μg/liter) have been detected in overburden monitoring wells downgradient of the landfill (Jordan, 1989).

- Analysis of four water supply wells in 1984 failed to identify contamination (NUS, 1984).

- According to the Orange County Health Department, there are no know water supply wells in the vicinity of Stewart ANGB that have been closed (Bragdon, 1988).

- No records of complaints about the quality of potable groundwater were located from the Orange County Health Department (Bragdon, 1988).

5.0 SURFACE WATER PATHWAY

The following discussion provides a brief summary of information gathered and observations made with regard to the potential for human exposure to contaminated surface water at the Stewart ANGB site. These data were obtained from the following sources:

Site Investigation Report, Stewart Air National Guard Base, Newburgh, New York. prepared by E.C. Jordan Co, 1989. (Jordan, 1989)

Evaluation of Analytical Data From City of Newburgh Water Supply Newburgh, New York, Stewart Annex, USMA Newburgh Landfill, Newburgh, New York, and New Windsor Landfill, New Windsor, New York. prepared by NUS Corporation, October 15, 1984. (NUS, 1984)

New York Natural Heritage Program (NYNHP). response to request for biological data on Stewart ANGB. correspondence from: Burrel Buffington, NYNHP; to: Norman Richardson, ABB Environmental Services. June 21, 1991. (NYNHP, 1991)

National Wetlands Inventory Map. U.S. Department of the Interior, Fish and Wildlife Service, 1990. (Wetlands Map, 1990)

Draft Federal/State Environmental Impact Statement. Proposed Development of Stewart International Airport Properties. Prepared by Berger, Lehman Associates, P.C., August 20. 1990. (BLA, 1990)

- Surface runoff from the Former Base Landfill drains to the east in the direction of Murphy's Gulch (Jordan, 1989).
- Surface runoff from the pesticide burial pit skirts the northern side of the Former Base Landfill along the Patrol Road, and settles in a man-made pond along the east side of the landfill (Jordan, 1989).
- Surface runoff from the New Windsor landfill flows northerly into Murphy's Gulch (NUS, 1984).
- A stream emerging from Murphy's Gulch flows in a northerly direction until it crosses under Orr Avenue. From here it flows to the east, eventually converging with an unnamed stream that originates from a pond on the east side of the New York State Thruway.

- In the past, this stream system was diverted to northern edge of Lake Washington via a diversion box (Murphy's Gate) on Union Avenue. This diversion was discontinued following the detection of pesticides in Murphy's Gulch (NUS, 1984).

- Lake Washington serves as the drinking water source for the City of Newburgh. The water is treated physically and chemically prior to distribution (NUS, 1984).

- The water supply for the Town of New Windsor is the Catskill Aqueduct (i.e., the New York City water supply). The water supply for the Town of Newburgh is Chadwick Lake, located 3 miles north of Stewart ANGB (Jordan, 1989).

- Surface water from Lake Washington and pre- and post-treatment water from the Newburgh water supply system were found to be free of contamination in 1984 (NUS, 1984).

- DDT was detected in one surface water sample from the man-made pond east of the Former Base Landfill (Jordan, 1989).

- Low concentrations (less than 0.2 mg/liter) of chloroethane, toluene, 2-butanone, and xylenes were detected in one surface water sample from Murphy's Gulch downgradient of the New Windsor landfill (NUS, 1984).

- In a review of the Significant Habitat Program and Natural Heritage Program files, the NY Natural Heritage Program did not identify any potential impacts associated with the Stewart ANGB on endangered, threatened or special concern wildlife species, rare plant, animal, or natural community occurrences, or other significant habitats (NYNHP, 1991).

- A Draft Environmental Impact Statement (DEIS) (BLA, 1990) identified several significant habitats located in the general vicinity of Stewart Air Force Base. These include wintering areas for white-tailed deer located five miles to the west of the landfill, and a large heron rookery located approximately three miles west.

- In addition, the DEIS listed a number of State threatened species or species of special concern that have been documented as occurring within five miles to the west of the landfill. These species include the red-shouldered hawk, upland sandpiper, grasshopper sparrow, eastern bluebird, Jefferson salamander, blue-spotted salamander, and spotted turtle. None of these species has been found within a mile of the landfill, however (BLA, 1991).

- Murphy's Gulch and the stream system emanating from the gulch are classified as a palustrine forested wetland, with limited areas of emergent marsh (Wetlands Map, 1990).

- Information on the volume of flow of the stream system emanating from Murphy's Gulch is not available from the NYSDEC.

6.0 SOIL PATHWAY

The following discussion provides a brief summary of information gathered and observations made with regard to the potential for human exposure to contaminated soil and sediment at the Stewart ANGB site. These data were obtained from the following sources:

Site Investigation Report, Stewart Air National Guard Base, Newburgh, New York. prepared by E.C. Jordan Co, 1989. (Jordan, 1989)

Evaluation of Analytical Data From City of Newburgh Water Supply Newburgh, New York, Stewart Annex, USMA Newburgh Landfill, Newburgh, New York, and New Windsor Landfill, New Windsor, New York. prepared by NUS Corporation, October 15, 1984. (NUS, 1984)

Draft Federal/State Environmental Impact Statement. Proposed Development of Stewart International Airport Properties. Prepared by Berger, Lehman Associates, P.C., August 20. 1990. (BLA, 1990)

Smith, J.S. ABB Environmental Services. personal communication with Lieutenant Colonel W.A. Steeney, Stewart ANGB. August 20, 1991. (Smith, 1991b)

Smith, J.S. ABB Environmental Services. personal communication with Major D.I. Zicha, Stewart ANGB. September 3, 1991. (Smith, 1991c)

U.S.G.S. Topographic Maps for Cornwall and Newburgh Quadrangles.

- The Former Base Landfill is located on the southeastern portion of the base complex. The landfill is approximately 550,000 ft^2 (14 acres) in size. The topography of the site is consistent with the gently rolling topography of the surrounding area. Hills and drainages in the area are aligned in a north-south direction.

- The eastern slope of the landfill is elevated above the surrounding terrain as a result of disposal activities. Household debris and demolition material are visible at the base of the eastern slope. The surface of the landfill is covered by thick brush and occasional scrubby trees.

- Approximately 75-percent of the landfill is enclosed within a chain-link fence that forms the base boundary.

- The entire Stewart ANGB is surrounded by either industrial/commercial or airport use areas. The area to the north and east of the Stewart ANGB is zoned interchange business. The area to the west and southwest is the Stewart Air Force Base and Airport. An area of planned industrial is located to the southeast of the Stewart ANGB (Jordan, 1989, Figure 2-1).

- Areas zoned as residential or neighborhood commercial area located beyond these industrial areas.

- The following estimates for the number of residences within a one mile radius of the Former Base Landfill were obtained from USGS Topographic Maps for the Cornwall and Newburgh Quadrangles.

DISTANCE (miles)	NUMBER OF RESIDENCES
0 - 0.25	0
0.25 - 0.5	20
0.5 - 0.75	50 + a trailer park
0.75 - 1.0	100

Approximately half of these residences are located in the Town of Newburgh and half in New Windsor. Most of the populated areas of the Towns of Newburgh and New Windsor and the City of Newburgh lie within a four mile radius of the Former Base Landfill.

- Population estimates and persons per household as of July 1, 1986 for the three municipalities surrounding the site are as follows (BLA, 1990):

MUNICIPALITY	POPULATION	PERSONS PER HOUSEHOLD
Town of Newburgh	22,340	3.09
Town of New Windsor	23,190	2.91
City of Newburgh	24,370	2.67

- There are no day care centers or schools within at least 0.25 mile of the Stewart ANGB (site visit Jordan, 1989).

- The entire Stewart ANGB lies within a two mile radius of the Former Base Landfill. Most of the structures on the base are between one and two miles from the site.

- There are no residences on the Stewart ANGB (Smith, 1991c).

- There are approximately 800 individuals that work at Stewart ANGB on a daily basis (Smith, 1991c). This number rises to approximately 1,600 during the once-per-month drill weekends (Smith, 1991c).

- Approximately 25 to 30 Stewart ANGB personnel work in two buildings about 100 yards west of the Former Base Landfill and pesticide burial pit. Groundskeepers maintain the grassed areas at the extreme northwest fringe of the landfill (Smith, 1991b).

- Metals, VOCs and SVOCs were either not detected in landfill soils (VOCs), detected but below background concentrations (metals), or detected in relatively low concentrations (PAHs) (Jordan, 1989).

- Several pesticides, including DDT, DDD, and DDE, were detected in surface soil/sediment samples from a man-made pond on the east side of the Former Base Landfill, from Murphy's Gulch, and the drainage pathway leading to the pond. Concentrations ranged from less than 1 mg/kg to 3.1 mg/kg (NUS, 1984; Jordan, 1989).

7.0 AIR PATHWAY

The are no data to suggest that contaminants related to the Former Base Landfill at Stewart ANGB have been released to the ambient air. There are no volatile contaminants associated with surface soil at the site. The landfill surface is vegetated and there are no activities at the site that would generate fugitive dusts. Therefore, future releases are unlikely. There are no records of odors or possible adverse health effects related to exposure to airborne contaminants from the landfill (Bragdon, 1988).

Stewart.dat

SITE_NAME ID	RING_DISTANCE	RING_TOTAL
SITE # 1	0.400000	0
SITE # 1	0.800000	0
SITE # 1	1.61000	1881
SITE # 1	3.22000	5609
SITE # 1	4.83000	18106
SITE # 1	6.44000	32567

GEMS POPULATION DATA FROM EPA INFORMATION SYSTEMS 12/91

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NUS Corporation, 1984. Evaluation of Analytical Data From City of Newburgh Water Supply, Newburgh, New York, Stewart Annex, USMA Newburgh Landfill, Newburgh, New York, and New Windsor Landfill, New Windsor, New York; prepared by NUS Corporation, October 15, 1984.

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National Wetlands Inventory Map. U.S. Department of the Interior, Fish and Wildlife Service, 1990; (Wetlands Map, 1990)

Smith, J.S., 1991a. ABB Environmental Services; personal communication with Steven DiDio, New Windsor Water Superintendent; August 21, 1991.

Smith, J.S., 1991b. ABB Environmental Services; personal communication with Lieutenant Colonel W.A. Steeney, Stewart ANGB; August 20, 1991.

Smith, J.S., 1991c. ABB Environmental Services; personal communication with Major D.I. Zicha, Stewart ANGB; September 3, 1991.

U.S. Geological Survey (USGS), 1991. U.S. Geological Survey, Computer Database Search of Wells Within Newburgh and Cornwall Quadrangles.

FIGURE 1
WATER SUPPLY WELLS IN THE VICINITY OF STEWART ANG BASE